REMARKS

Rejection Under 35 USC 102

Claims 1-20 have been rejected under 35 USC 102(e) as being anticipated by Feldman (4,398,824). Claims 1, 11, and 15 are independent claims from which the remaining pending claims depend. Applicant submits that claims 1, 11, and 15 are not anticipated by nor rendered obvious over Feldman, such that for at least this reason, the remaining pending claims are also patentable. Both claims 1 and 11 are directed to a "system for monitoring semiconductor wafer tilt of a semiconductor wafer," as to which they are limited in their preamble. Claim 15 is directed to a "method for monitoring semiconductor wafer tilt on a semiconductor wafer," as to which it is limited in its preamble.

Applicant notes that the preamble to a claim is to be accorded "the import that the claim as a whole suggests for it." (MPEP, sec. 2111.02) More specifically, "[i]f the claim preamble, when read in the context of the entire claim, . . . 'is necessary to give life meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim." (*Id.*)

The MPEP additionally cites *Kropa v. Robie*, 187 F.2d 150 (CCPA 1951), as providing an example that is particularly apt in the context of the preambles of claims 1, 11, and 15.

> A preamble reciting "An abrasive article" was deemed essential to point out the invention defined by claims . . . . The court stated that "it is only by that phrase that it can be known that the subject matter defined by the claims is comprised as an 'abrasive article.' . . ." Therefore, the preamble served to further define the structure of the article produced.

(MPEP, sec. 2111.02) Similarly, it is by the phrase "a system for *monitoring semiconductor wafer tilt* of a semiconductor wafer" and the phrase "a method for *monitoring semiconductor wafer tilt* of a semiconductor wafer" that it can be known that the subject matter defined by claims 1, 11, and 15 is directed to the monitoring of semiconductor wafer tilt.

Claims 1, 11, and 15 also have other limitations that inform that the subject matter of these claims is directed to the monitoring of semiconductor wafer tilt. Claim 1 includes the limitation of "where the detected light value deviating from a normal value corresponding to no

wafer tilt indicates that the wafer has tilted," such that it is clear from the non-preamble limitations of claim 1 that claim 1 is directed to monitoring wafer tilt. Similarly, claim 11 includes the limitation of "where the wafer tilt value deviating from a normal value corresponding to no wafer tilt indicates that the wafer has tilted," such that it is clear from the non-preamble limitations of claim 11 that claim 11 is directed to monitoring wafer tilt. Finally, claim 15 includes the limitation of "determining that wafer tilt of the semiconductor wafer has occurred where the one or more light values deviate from a normal value corresponding to no wafer tilt," such that it is clear from the non-preamble limitations of claim 15 that claim 15 is directed to monitoring wafer tilt.

Applicant submits that Feldman is not directed to monitoring semiconductor wafer tilt, such that it cannot anticipate nor render obvious an invention, such as that of claims 1, 11, and 15, directed to monitoring semiconductor wafer tilt. Applicant very respectfully but emphatically submits that the Examiner has mistakenly read and interpreted Feldman in this regard. On a most general level, for instance, Feldman "is a method and apparatus *for aligning a semiconductor wafer in a manner which is essentially independent of local wafer tilt and/or non-uniform resist thickness.*" (Col. 2, ll. 44-44) (emphasis added) That is, Feldman's disclosure and teachings are directed not to monitoring semiconductor wafer tilt, but in fact the almost exact opposite – the aligning of a semiconductor wafer in a way that *ignores* wafer tilt. On a most general level, therefore, Feldman cannot anticipate nor render obvious the claimed invention because the preambles of the claims make clear that the claimed invention is directed to a method or a system for monitoring wafer tilt, not a method or system for aligning a semiconductor wafer in a way that *ignores* wafer tilt.

On a more specific level, Feldman also cannot anticipate nor render obvious the claimed invention. The basis upon which Feldman's method and apparatus work is that:

> The invention relies on the fact that in the presence of local wafer tilt and/or nonuniform resist thickness, the real and virtual images formed by a Fresnel zone plate alignment mark are displaced from the positions that they would occupy in the absence of local wafer tilt and nonuniform resist thickness by an amount proportional to their distances from the wafer surface. Real images located a

> positive distance in front of the wafer surface are displaced in the opposite direction from virtual images located a negative distance behind the wafer surface.
>
> ***We have found that a convenient alignment technique can be achieved by using two of the images formed by a Fresnel zone plate alignment mark.***
>
> . . .
>
> ***Alignment is achieved when the first and selected projected images are displaced from positions, preselected for each of the projected images, by amounts substantially proportional to the first and second prescribed distances, respectively. This alignment condition is independent of local wafer tilt . . . .***

(Col. 2, ll. 41-68, through col. 3, ll. 1-3) (emphasis added) Reading the remainder of Feldman with respect to this excerpt of Feldman, which provides the principle for how Feldman works and the basic teachings of Feldman, informs how Feldman specifically cannot anticipate nor render obvious the claimed invention of any of the claims.

As only one example, with respect in particular to dependent claim 7, independent claim 11, and dependent claims 17 and 18, these claims are limited to inclusion of a comparator or "comparing". In claim 7, the comparator "compare[s] the first detected light value and the second detected light value as an absolute difference, where the absolute difference deviating from a normal absolute difference corresponding to no wafer tilt indicates that the wafer has tilted." Claim 17 is correspondingly limited in method form. In claim 11, the comparator is "to compare the detected light value sensed by each of the pair of light detectors as a wafer tilt value, where the wafer tilt value deviating from a normal value corresponding to no wafer tilt indicates that the wafer has tilted." Claim 18 is somewhat correspondingly limited in method form.

However, the comparator of Feldman is not directed to determining such an absolute difference or wafer tilt value, since Feldman's purpose is to perform alignment irrespective of wafer tilt, not to determine whether a wafer has tilted. The Examiner erroneously relies upon column 5, lines 2-31, of Feldman as anticipating the limitation of claims 7, 11, 17, and 18 that, where the absolute difference or wafer tilt value deviates from a normal absolute difference or value corresponding to no wafer tilt, the wafer has in fact tilted. In actuality, however, Feldman's comparator determines whether the projected images R' and V' are "substantially equally and oppositely displaced from preselected location P." (Col. 5, ll. 18-20) When R' and

V' are displaced at equal but opposite distances from the position P, "alignment is achieved in accordance with the principles of the present invention." (Col. 5, ll. 14-15) "Standard comparator circuit 28 is adapted to determine when this condition is satisfied." (Col. 5, ll. 39-40)

That is, the Examiner would read Feldman so that the positions of the projected images R' and V' are compared to the preselected location P, since "in the absence of local wafer tilt the two projected images R' and V' would coincide with P." (Col. 5, ll. 23-25) However, the goal of Feldman is to achieve alignment, not monitor wafer tilt. Therefore, Feldman compares the positions of the projected images R' and V' against one another, such that when they are substantially equal, albeit oppositely signed, alignment has occurred. Feldman does not care whether wafer tilt has occurred, but rather wants to know when alignment has occurred, even if there is semiconductor wafer tilt. Feldman does not compare R' or V' to P to ensure that there is no wafer tilt, but rather compares R' and V' against one another to ensure that alignment has occurred, and in so doing, *ignores* semiconductor wafer tilt.

By comparison, with particular respect to claims 7 and 17, these claims are specifically limited to comparing an absolute difference between first and second detected light values against a normal absolute difference corresponding to no wafer tilt to determine whether the semiconductor wafer has tilted. There is no analogous absolute difference in Feldman. For instance, the absolute difference of R' and V' determines whether alignment has occurred, not whether the semiconductor wafer has tilted. Indeed, the absolute difference of the absolute values of R' and V' will be substantially equal to zero where alignment has occurred, even when there is semiconductor wafer tilt. Therefore, Feldman does not anticipate claims 7 and 17. Furthermore, there are no two values within Feldman such that their absolute difference can be employed to determine whether semiconductor wafer tilt has occurred, such that Feldman cannot render obvious claims 7 and 17.

In addition, with particular respect to claims 11 and 18, these claims are specifically limited to compare values against normal values corresponding to no wafer tilt to determine whether the semiconductor wafer has tilted. In Feldman, the analogous situation would be to

compare R' and/or V' against P to determine whether the semiconductor wafer tilt has occurred. However, there is no component or method step in Feldman to perform such a comparison. The comparator in Feldman, for instance, compares R' against V', not R' or V' against P. Therefore, Feldman does not anticipate claims 11 and 18. Furthermore, there is no suggestion or motivation to modify Feldman to perform such a comparison. The purpose of Feldman is to achieve alignment, without regard for wafer tilt. To modify Feldman to determine whether wafer tilt has occurred would thus destroy Feldman's intended purpose, by directing Feldman to monitor wafer tilt, instead of achieving alignment in a way that ignores wafer tilt. Therefore, Feldman cannot render obvious claims 11 and 18.

Conclusion

Applicant has made a diligent effort to place the pending claims in condition for allowance, and request that they so be allowed. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Randy Tung, Applicant's Attorney, at 248-540-4040, so that such issues may be resolved as expeditiously as possible. For these reasons, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

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